

rib which exceeds approximately 1/3 the length of the rib should be repaired by an extension splice with the same requirements as for the insertion repair. The insertion or extension member must be attached to the structure with the same rivet pattern as the original member.

### 3-97. RUDDER.

3-98. DESCRIPTION. (See Figure 3-1.) The rudder is made of 24ST alclad sheet, beaded and wrapped around three formed ribs and two spars. There are no other stiffeners. At the bottom of the rudder is a .032 5250 aluminum alloy removable boot in which the tail light is installed. The rudder hinges are provided with staked in ball bearings. A fixed trim tab is riveted to the trailing edge at the center rib.

### 3-99. RUDDER SKIN.

3-100. DESCRIPTION. The skin is a single sheet of .016 gage 24ST alclad sheet, beaded and riveted to the front and rear spar flanges with modified brazier head AD4 rivets. It is continuous around the trailing edge ending on the top and bottom of the leading edge.

3-101. NEGLIGIBLE DAMAGE. Smooth dents located anywhere on the rudder skin and free of cracks and abrasions may be disregarded, provided these dents do not exceed a depth of 1/8 inch and a diameter of 1-1/2 inches and adjacent dents are at a distance of 15 inches. Dents exceeding the above limits and subsequently bumped back to contour without cracking or creasing the skin may be classified as negligible damage. Scratches which do not penetrate beyond the alclad coating are considered negligible damage.

3-102. DAMAGE REPAIRABLE BY PATCHING. Damage to the rudder skin which exceed the limits of negligible damage should be repaired by patching. See Figures B-1 through B-3.

3-103. DAMAGE NECESSITATING REPLACEMENT. Damage to the skin panels which cannot be repaired by patching must be repaired by replacement of the panel rather than attempting an insertion repair.

### 3-104. RUDDER MAIN BEAM.

3-105. DESCRIPTION. The rudder main beam is a channel formed of .032 24ST alclad with beads and flanged lightening holes.

3-106. NEGLIGIBLE DAMAGE. Web damage not exceeding the following limits requires no repair or reinforcement. Smooth dents free of cracks and abrasions and clear of lightening hole flanges and bends may be disregarded, provided the dents do not exceed a depth of 1/8 inch and a diameter of 1-1/2 inches and adjacent dents are at a distance of 15 inches. Web dents exceeding the above limits and subsequently bumped back to contour without cracking, creasing or oil canning the web may be classified negligible damage. Bent or dented beam flanges free of cracks and abrasions which are reworked to their original shape, free of waviness, and without cracking or creasing may be considered negligible damage. Scratches located anywhere on the beam, which do not penetrate beyond the alclad coating may be considered negligible damage.

### 3-107. DAMAGE REPAIRABLE BY PATCHING.

3-108. DAMAGED FLANGE AND ADJACENT WEB. The skin attachment flange and approximately 5/8 inch of the

adjacent web are considered the effective flange portion of the beam. Damage to any portion of either the upper or lower effective flange which exceeds the specified limits of negligible damage may be repaired similar to figure 4-3. One angle may be used to repair damage. Nest the angle inside the damaged flange and adjacent web. Four AN470AD5 rivets are required through the flange each side of the damaged area. Space the web rivet rows approximately one inch apart, with one row outside the damaged area. Three AN470AD5 rivets are required per web row on each side of the damaged area.

3-109. BEAM SPLICE. Damage affecting more than half of the beam cross-sectional area requires a splice. A repair similar to that shown in figure 4-3 should be used. Two angles nesting inside the beam are used to span the damaged region. Four AN470AD5 rivets are required through each skin flange each side of the damaged area. Space web rivet rows approximately one inch apart the depth of the beam. Three AN470AD5 rivets are required per row on each side of the damaged area.

### NOTE

The use of a rudder jig is recommended in order to hold alignment of the structure while the repair is being accomplished.

3-110. DAMAGE REPAIRABLE BY INSERTION. Damage to the main beam which is more than five inches in length vertically requires a complete splice to be repaired by an insertion member. The insertion member must be of the same material, section and gauge as the existing structure. The ends of the insertion member must be butted and spliced to the existing structures, using the repair data shown in figure 4-3 and paragraph 3-109. Damage to either extremity of the beam must be repaired by means of an extension splice.

### 3-111. RUDDER AUXILIARY BEAM.

3-112. DESCRIPTION. The rudder auxiliary beam is a channel formed of .020 24ST alclad sheet.

3-113. NEGLIGIBLE DAMAGE. Same limits as specified for elevator rear beam, see paragraph 3-50.

3-114. DAMAGE REPAIRABLE BY PATCHING. Damage to the rear rudder beam which exceed that specified in paragraph 3-113 must be repaired. Repairs to be same as that for elevator auxiliary beam. See paragraph 3-51.

### 3-115. RUDDER RIBS.

3-116. DESCRIPTION. All three ribs are formed of .032 24ST alclad sheet, none have beads or lightening holes.

3-117. NEGLIGIBLE DAMAGE. Smooth dents free of cracks and abrasions and clear of flanges may be disregarded, provided the dents do not exceed a depth of 1/8 inch and a diameter of one inch and adjacent dents are at a distance of 10 inches. Dents exceeding the limits, and bent flanges, subsequently bumped back to contour without cracking or creasing the rib may be classified negligible damage. Scratches which do not penetrate beyond the alclad coating may be considered negligible damage.

3-118. DAMAGE REPAIRABLE BY PATCHING. Damage to the ribs which may vary in extent and location must be repaired in accordance with the repair data shown in figure B-5.